### **Small Public Water System Guidance**

# How to Hire an Engineer

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Colorado Department of Public Health and Environment

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Public water systems need the services of a professional engineer when constructing a new public water system, adding a new source, installing treatment, or making modifications to existing treatment processes. Many cities, water district systems, and larger privately owned systems frequently have an engineer on staff or under contract. Smaller water systems must hire engineers as the need arises.

Small system may have limited experience in hiring an engineer and may need help deciding what questions to ask and criteria to use in selecting an engineer. This guidance is designed to help small systems in such situations.

#### Professional Engineer (PE)

A Professional Engineer is a person who has had specialized college education and engineering experience and who has been examined and is currently licensed by the state of Colorado.

- Section 1.11.2 (b) of the Colorado Primary Drinking Water Regulations <u>requires</u> a
  professional engineer registered in the State of Colorado design all treatment systems
  serving a community water supply.
- There are numerous technical details involved in designing and installing a water system.
   Some of them, such as friction loss, valve sizing and placement, soil conditions, and treatment alternatives, require the expertise, knowledge, and experience of a trained professional engineer

#### **Engineering Specialties**

There are many categories of engineering specialties. Two commonly employed by water systems are civil and environmental engineers, but these are by no means the only ones that might be appropriate.

The engineer selected must be a Professional Engineer (PE) licensed by the state of Colorado and should have experience with public water systems. If you are hiring an engineering firm, make sure the engineer working on your project is a Professional Engineer with the qualifications and experience in designing drinking water systems and treatment.

#### The Selection Process

There are several ways of finding engineers who may be interested in and capable of providing the needed services.

The basic process:

- 1. Decide what scope of work you want an engineering firm to complete.
- Find potential engineers or engineering firms.
- 3. Indentify prospective engineers / engineering firms.

- 4. Check references.
- 5. Final selection of an engineering firm.
- 6. Negotiate the contract based on your scope of work identified in number 1 above.

## Step 1. Decide what scope of work you want an engineering firm to complete.

This decision should be based on an analysis of the condition of your present system or your community's/district's identified need or problem.

For example, if your town has radionuclide problem, part of the scope of work would be to ask for an assessment of the present system, treatment and non-treatment options such as consolidation or finding a new source of water, and projected costs for each of those options.

Request options for a set number of years (20?) considering population, land availability, water source and other issues you have identified. This "Scope of Work" will be the most important portion of your selection process.

After the scope of work has been completed, the water system will need to decide which process will be used for selecting an engineer. If the system is required or chooses to follow a more formal selection process, such as through a Request for Proposal, additional documents may need to be drafted. There are a number of templates available online to help develop either a scope of work or an RFP.

#### **Step 2.** Find potential engineers or engineering firms

- Consult the yellow pages of the telephone books for larger towns and cities. Listed under "Engineers" will be various categories of engineering specialties. You may want to send a copy of your "Scope of Work" to the firms that may meet your needs. OR
- Write a request for proposals (RFP) or Notice of Availability of RFP (NOAORFP) and publish the RFP or NOAORFP in at least three (3) regional daily newspapers and mail them to some engineering firms you may have identified. (You will need to screen all proposals and select the firms you are interested in for inclusion in Step 3.

  OR
- Contact other water systems to determine which engineers have provided them with satisfactory service.

#### Step 3. Identify prospective engineers and / or engineering firms

If the system is following a formal selection process, such as through a Request for Proposal, then the selection process will likely be done through the review and evaluation of the bids submitted in accordance with the RFP. If the system follows a more informal route, then you should contact at least three engineers and briefly discuss what work is needed, and find out if

they are interested. If a grant or loan is involved, a more formal process may be required. Check with the funding agency. Interview three or more of the engineers expressing an interest, based upon your selection criteria.

The primary considerations are **relevant experience** in the types of services needed and **demonstrated ability to serve in a timely and effective manner**. The basic criteria you will be evaluating during the evaluation process include:

- Knowledge The engineer should have specialized education or training in the aspect
  of public water system planning or engineering that the small water system needs.
- Experience The engineer should have professional engineering experience with similar water system projects for a similar size system. If your system has a specific issue, such as a violation of a Maximum Contaminant Level, then the engineering firm selected should have specific knowledge and experience with treatment technologies available to remove such contaminants.
- Ability to Serve The engineer should demonstrate that sufficient uncommitted time
  and other resources are available to perform the services within the time needed by the
  water system.
- **Communication** The engineer should demonstrate the ability to communicate in a thorough and timely manner as needed to keep the water system fully and satisfactorily informed.
- References The engineer should provide three or more references from previous clients for water system engineering services performed. In addition to a contact person, you may want to ask for information about the type of project, the year the project was undertaken, the total actual versus estimated cost of the project, and the name of the engineer in charge of the project.

### Step 4. Check the references!

Contact their references and ask how the engineer performed the assignment. If possible, visit the references' water systems and their completed projects.

You may want to check the Department of Regulatory Affairs (DORA) Automated Licensure Information System Online (ALISON) site to find any board or program actions against a professional engineer as well. The web address is: <a href="http://www.dora.state.co.us/registrations/Verification.htm">http://www.dora.state.co.us/registrations/Verification.htm</a>.

#### Step 5. Final selection of an engineering firm.

Rank the engineers in order of preference. Ask the first-ranked engineer to submit a written proposal if one was not already submitted in response to a Request for Proposal. The proposal should include such details as what work will be accomplished, how the work will be done, how

much time it will take, what fees will be charged, and what payment method will be acceptable. Meet with the engineer, if necessary, to discuss any items not fully addressed in the proposal. If the proposal is acceptable, proceed to the contract stage

### Step 6. Negotiate the contract based on your scope of work identified in number 1 above.

Engineering fees may be based on a set fee per day, cost times a factor, lump sum, or percentage of project cost. Whatever financial arrangements are made, the specifics of services to be performed and how they are to be reimbursed should be fully agreed upon before a contract is signed. Details that commonly need to be worked out include:

- Will travel time be an additional charge and, if so, at what rate?
- Will the fee include all consultations, or will each meeting above a set number be an additional charge?
- How will the water system be charged if WQCD requires changes or additions to the engineer's submittal?
- Will a particular pay option provide incentives for the engineer to save money for the water system?
- Are there specific or itemized services that the engineer will not provide?
- What are the services the engineer will provide in addition to design plans and specifications?
- Who specifically from the engineer firm will be working directly with your system? What are the qualifications and experience of this person?
- How much of the work on the project would be subcontracted?
- Is the engineer familiar with the various funding programs in the state for water systems such as yours? What is the engineer's experience in working with these funding agencies? Has the firm assisted water systems on grant writing and the application preparation?

Generally the engineer will provide the contract, including a mutually acceptable scope of work. Have the contract reviewed thoroughly by your water system's attorney.

If the terms and conditions of a contract are mutually acceptable, let the other engineers who were interviewed know of the selection. If contract terms cannot be mutually agreed upon, end negotiations with the engineer and begin to negotiate with the second ranked engineer.

If a grant or loan is involved, have the funding agency review the contract before signing	j it.

#### Types of services commonly performed by an engineer

There is no standard package of services that engineers perform. The services are tailored to the specific needs of each small water system. However, there are generally three phases of a design and construction project that the engineer is involved in: planning and preliminary design, final design, and construction.

- Planning and Preliminary Design Phase Involves studying the problem, determining
  alternate solutions, outlining the basic concept, making preliminary cost estimates, and
  establishing project feasibility. The water system should not go into a project with a
  preconceived idea of what is needed. The engineer should not be expected to just give a
  "seal of approval," but should actually perform an analysis of alternatives.
- Final Design Phase Includes design, field work, preparation of construction documents and cost estimate, as well as submittal to and obtaining approval of all required agencies, including local and county jurisdictions, agencies overseeing waste handling. The engineer may assist in preparing a grant or loan application for the construction of the project. If a grant or loan is helping to pay for the project, additional requirements will need to be included in the bidding documents the engineer prepares. The engineer should be familiar with the requirements, or may need to consult with the funding agency.
- Construction Phase May involve construction staking, managing the hiring of a
  contractor, surveillance and inspection of the contractor's work during construction, review of
  contractor's progress payment requests, and other matters required to assist the system in
  the construction phase. Preparation of as-built drawings and completion of the WQCD asbuilt certification is also often included in this phase.

An engineer may perform the following services regarding the planning, design, and construction of water systems:

- Identifying source, storage, treatment, or water distribution system problems.
- Analyzing alternate solutions to these problems.
- Assuring that the system designed will function properly and be efficient and economical.
- Assisting the system perform a Capacity Assessment (technical, managerial, and financial) in accordance with the criteria of the New Public Water System Capacity Planning Manual, as applicable for newly established public water systems.
- Preparing detailed design and construction documents to implement the selected solution to the problems.
- Helping the system get plan approval from the Colorado Department of Public Health and Environment (CDPHE) – Water Quality Control Division (WQCD)
  - o Planning and Preliminary Design Phase
  - Final Design Phase
- Helping the system get approval for residuals and waste handling from appropriate oversight agencies

- CDPHE Hazardous Materials and Waste Management Division (Solid Waste Unit, Radiation Management Unit), Water Quality Control Division (Wastewater Permits Unit)
- o Local County Building, Zoning, and / or Environmental Health Departments
- Helping the system solicit and evaluate bids from contractors to perform the work.
- Inspecting and testing the quality of a contractor's work and making necessary reports and recommendations to the water system.
- Completing WQCD certification documents to the extent that the engineer has direct knowledge of the as-built facilities.